



Safety Lines

ENGINEERING SAFETY NEWSLETTER, OCCUPATIONAL SAFETY AND HEALTH SERVICE

No. 63, September 2004

Boiler Incident



Furnace from the burner end

Last year there was a non-injury incident involving a 1.2 MW shell boiler, which suffered a collapse of the furnace due to inadequate water level.

The two-pass boiler was built in 1977 to the old New Zealand Boiler Code, and at the time of failure was being fired on natural gas. It was being operated in the under 15hp category. As

can be seen from the photograph, damage was extensive and resulted in the need for replacement of the boiler. A detailed report on the incident was produced by an inspection body, as required by regulation 9 of the PECPR Regulations.

It is considered that the most probable initial factor bringing about the low water condition

was sticking of the primary low water alarm sensor float in its guide tube. It was found that the wiring was such that the primary alarm would not have functioned if the feed pump contactor had not operated. It was further noted that the secondary device was incorrectly wired, permitting its alarm to function but not its cut-out. These circumstances resulted in the water level falling without the pump supplying additional water. When dismantled for examination after the incident, both floats appeared to be free. There was some evidence of moisture ingress to the magnetic guide sensors and detection switches, but this was ruled out as a contributory factor to the incident.

It was concluded that an intermittent fault of the primary device occurred, inhibiting pump activation and its low level cut-out. This, coupled with incorrect wiring of the secondary device, permitted the unsafe condition to arise.

The report made some recommendations, which can be generalised for under 15hp boilers as follows:

1. It is essential to record boiler operating conditions and events such as alarm calls, breakdowns, routine maintenance, and alarm testing.

2. Alterations to boiler safety features must have the appropriate approval of the boiler manufacturer and inspection body.
3. A responsible person must be within hearing distance of boiler alarms and immediately available at all times during boiler operation. This person must be trained in operation and supervision of the boiler, such training being documented for auditing purposes. Direct observations by this responsible person must be made at intervals not exceeding 2 hours. (See clause 4.3 of the *Approved Code of Practice for the Design, Safe Operation, Maintenance and Servicing of Boilers.*)
4. The particular boiler involved in this incident had no external float chamber, and it proved difficult to test the secondary low water alarm independently of the primary low water alarm. For similarly configured boilers, a test circuit should be installed, which would allow the secondary alarm to be independently tested (by enabling the operator to manually hold in a primary alarm bypass).

Engineering Safety Staff Contact Details

	Phone	Fax	Email
Bryn George	(04) 915-4433	(04) 915-4370	bryn.george@dol.govt.nz
Peter Williamson	(04) 915-4461	(04) 915-4370	peter.williamson@dol.govt.nz
Geoff Edwards	(04) 915-4435	(04) 915-4370	geoff.edwards@dol.govt.nz
Robin Bain	(04) 915-4446	(04) 915-4370	robin.bain@dol.govt.nz
Maurice Flood	(04) 915-4440	(04) 915-4370	maurice.flood@dol.govt.nz

Workplace Group
 Department of Labour
 4th floor, Unisys House, 56-62 The Terrace
 PO Box 3705, Wellington

Ladder Safety Tests

As a result of accidents and a recent product recall involving metal stepladders, Workplace Health and Safety (WH&S), a service of the Department of Labour, has decided to investigate the safety of this equipment for workplace use. The investigation is focussing on two common types of ladder. These are the single-sided stepladder, which is the basic self-supporting model with treads on the front but not on the back, and the dual-purpose stepladder, also a self-supporting model but which has treads on front and back and which can be adjusted (extended) to become a non-self-supporting portable ladder.

The safety standard AS/NZS 1892.1:1996 *Portable ladders - Part 1: Metal* was selected as the basis of tests to determine the performance level, as industrial ladders, of commercially available stepladders. The standard provides performance criteria for over twenty tests for such features as stability (static and structural), strength (as assessed through deflection or deformation under load), and locking device effectiveness.

WH&S has contracted the Building Research

Association of New Zealand (BRANZ) to carry out the tests at its Judgeford testing laboratory. Twelve ladders of various makes have been provided by WH&S for these tests. WH&S input is being co-ordinated by Alan Barrett (Business Policy Advisor - Construction) and Geoff Edwards (Safety Engineer). Testing commenced on 26th July 2004 and is continuing. A further article will report on conclusions when the results of this testing is complete.

In addition to any necessary action on ladder design/manufacture, as a result of the ladder safety tests, further recommendations may be made with respect to the appropriate selection, maintenance, and use of stepladders.

Information on stepladder safety is contained in the following WH&S publications, which can be downloaded free from www.osh.dol.govt.nz:

- *Guidelines for the Prevention of Falls*
- *Construction Bulletin No. 3 - Safe Ladder Use*
- *Construction Bulletin No. 16 - Stepladder Safety*

Announcements

The following organisation has been recognised under the PECPR Regulations as an Inspection Body for fabrication inspection of pressure equipment:

TÜV Industrie Service GmbH
TÜV Rheinland Group
Am Grauen Stein
51105 Köln
GERMANY

The following organisation has been recognised under the PECPR Regulations as a Qualification Issuing Agency for the issue of National Certificate in Energy and Chemical Plant qualifications:

Extractive Industries Training Organisation
PO Box 2623
Christchurch

A full list of recognised inspection bodies and qualification issuing agencies along with known contact details can be viewed at the Engineering Safety website, which can be accessed via the OSH website www.osh.dol.govt.nz using the services button, or by going directly to www.osh.dol.govt.nz/services/eng-safety/index.shtml

2004 National Forklift Drivers' Competition

The eight regional rounds of the annual National Forklift Drivers' Competition were concluded in September, and fourteen finalists have been selected to compete for the national title in Auckland on the 13th and 14th of October.

Eight regional winners representing Otago, Canterbury, Nelson, Wellington, Manawatu, Hawkes Bay, Waikato and Auckland, qualified for the finals. From all of the remaining participants nationally, the best performing six also qualified. Included among these finalists is the first female operator to qualify for the National Finals since its inception in 1992, making this occasion a true "test of the best".

OSH provides the judging panel for this event headed by Chief Judge, Maurice Flood of OSH Engineering Safety. "This year's national finals will be very close as there will be a fairly even skill match amongst the fourteen finalists", said Maurice.

Contestants' skills and knowledge will be tested

with various practical assessments being undertaken along with written examinations. The judges will be looking for safety, skill, efficiency and knowledge of forklifts.

Competition will be intense over the \$7,500 in cash, prizes and trophies, with the outright winner also receiving a trip for two to the 2005 Formula One Grand Prix in Melbourne.

The main objectives of the event are to promote safety combined with productivity in the workplace, and encourage forklift operators to enhance their skills, so that both employers and employees benefit from involvement. The competition is sponsored by Nissan Forklifts, Loadlift Equipment, Mainfreight, Timpack, and OSH.

Spectators at any of the sessions are welcome to attend free of charge. The venue is Loadlift Equipment Ltd, 13 Sims Road, Penrose.

Results will appear in the next issue of *Safety Lines*.

Lockout – Safe Practices for Isolation of All Sources of Energy

Lockout is the use of a lock to render machinery or equipment inoperable or to isolate an energy source. The purpose is to establish zero energy. This is where all sources of energy including electrical, pneumatic, hydraulic, mechanical and stored energy are isolated so that they pose no danger.

The purpose of zero energy and lockout is to prevent the release of an energy source that could activate moving parts on equipment or machinery.

Lockout is important for operators, maintenance staff, contractors, cleaners and any other person required to work near moving parts of machinery.

Once it has been determined that lockout is necessary, the following basic steps are required:

- Identify the machinery or equipment that needs to be locked out.
- Shut off the machinery or equipment. Make sure that all moving parts have come to a complete stop. Also ensure that the act of shutting off equipment does not cause a hazard to other workers.
- Identify and de-activate the main energy-isolating device for each energy source. This may include:
 - o Disconnecting the electrical power to the pump or compressor;

- Closing the valve feeding the cylinder.
- Apply a personal lock to the energy-isolating device for each energy source and ensure that all parts and attachments are secured against inadvertent movement.
- Test the lockout to make sure it is effective and to verify that each energy source has been effectively locked out. (First ensure that all workers are in the clear and that no hazard will be created if the lockout is not effective).
- Test the lockout to make sure zero energy is effective (e.g. press start button).
- Test to make sure the pump or compressor will not start and that the flow does not bypass the valve.
- Make sure there is no residual pressure in the lines, reservoirs, or accumulator feeding the cylinder. Bleed any residual pressure.

- Check to ensure that there is zero energy in the system (mechanically support any raised load).
- Rule out inadvertent start up - consideration must be given to light beams, pressure sensors and computer controlled systems that may activate a machine automatically.

Lockout of a machine does not necessarily mean that there are no other hazards present. Be aware of such things as tripping and fall hazards if working at height or in awkward locations. Safe working platforms must be provided in all areas a worker is likely to go.

*This article appeared in issue 28 of Northland's Quarterly Newsletter on Occupational Safety and Health, and was based on an information sheet, entitled **Lockout! - Safe practices for isolation of all sources of energy**, produced by OSH ACC Rotorua Timber Processing Group.*

HERA Courses and Seminars

HERA Training Centre is offering the following courses and seminars during the remainder of 2004:

Activity	Dates
Welding Inspection HERA House	29 November to 3 December
Management appreciation in non-destructive testing HERA House	13 October
Designing Welded Structures for Fatigue Auckland Wellington	19 November 23 November
Economic Evaluation of Steel Structures Auckland Wellington Christchurch	12 October 13 October 14 October

The HERA House venue is as follows (for others contact HERA):

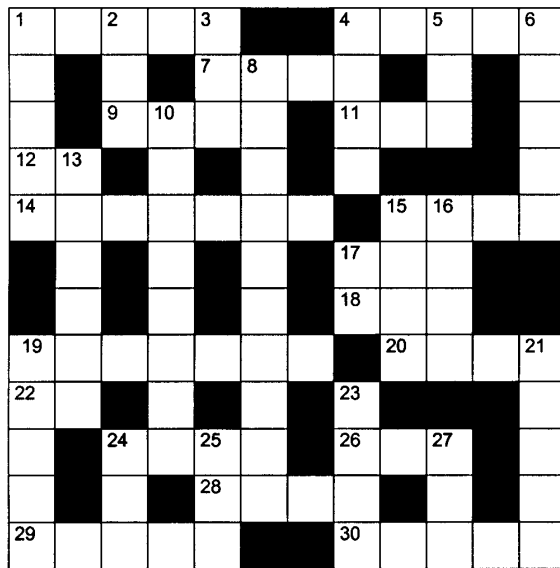
HERA House
17-19 Gladding Place
MANUKAU CITY (South Auckland)

Note: Enrolment closes 7 days before start of course.

For further details contact:

HERA Training Centre
PO Box 76134
Manukau City
Phone: 09 262 2885
Fax: 09 262 2856
[Email: admin@hera.org.nz](mailto:admin@hera.org.nz)

Puzzle Place



Answers include abbreviations and acronyms.

Across

- 1 Lodger
- 4 1/farad
- 7 Hotchpotch
- 9 Basic items of information
- 11 Non-destructive testing
- 12 System of units
- 14 Cosier
- 15 Curve parts
- 17 Big bird
- 18 Metal
- 19 Distribute
- 20 Consider
- 22 Rhenium
- 24 Sign
- 26 International standards body
- 28 A long time
- 29 Resided
- 30 Unit of radioactivity

Down

- 1 Unit of magnetic induction
- 2 Finish
- 3 Small child
- 4 Puts on
- 5 Rodent
- 6 Glides along
- 8 Tearing
- 10 Unit of length
- 13 Not out there (2,4)
- 15 In the middle of
- 16 Mysterious mark
- 17 Alien from beyond Earth
- 19 Slightly projecting
- 21 Unit of length (bigger than 10 down)
- 23 Flat thin circular object
- 24 Small number
- 25 Consume
- 27 Belonging to us

Answers can be obtained by email from robin.bain@dol.govt.nz.

Answers to *Safety Lines* Issue 62 Crossword

Across

- 1 Duds
- 4 Volt
- 8 Agog
- 9 Steam
- 12 Usage
- 15 Midget
- 16 Rating
- 19 Acted
- 21 Essay
- 24 Able
- 25 Tree
- 26 Step

Down

- 2 Urge
- 3 Swami
- 4 Vague
- 5 Lava
- 6 Gas
- 7 SAE
- 10 Telarc
- 11 Ampere
- 13 Stings
- 14 Guinea
- 17 Adage
- 18 Needs
- 19 Awe
- 20 Torr
- 22 Shoe
- 23 Yak

Safety Lines is a publication of the Engineering Safety Unit of the Occupational Safety and Health Service, Department of Labour, PO Box 3705, Wellington.

Editor: Robin Bain

Phone: (04) 915 4446

Fax: (04) 915-4370

Email: robin.bain@dol.govt.nz

Table of Contents

Boiler Incident	1
Ladder Safety Tests	3
Announcements	3
2004 National Forklift Drivers' Competition	4
Lockout – Safe Practices for Isolation of All Sources of Energy	4
HERA Courses and Seminars	5
Puzzle Place	6